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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/055,726 | 01/23/2002 | John R. Rhodes | SPE503/4-6CIPUS | 8318 |
| 21586 | 7590 | 04/02/2004 | EXAMINER | |
| VINSON & ELKINS, L.L.P. 1001 FANNIN STREET 2300 FIRST CITY TOWER HOUSTON, TX 77002-6760 | | | GAKH, YELENA G | |
| | | ART UNIT | PAPER NUMBER | |
| | | 1743 | | |

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

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|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/055,726 | RHODES, JOHN R. | |
| | Examiner | Art Unit | |
| | Yelena G. Gakh, Ph.D. | 1743 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 February 2004.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 28-57 and 59-68 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) 59-68 is/are allowed.
 6) Claim(s) 28-57 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Amendment and Response filed on 02/20/04 are acknowledged. Claims 1-27 and 58 are cancelled without prejudice. Claims 28-57 and 59-68, are pending in the application.

Response to Amendment

2. Rejections of the pending claims are modified in view of the amendment and the Applicant's arguments.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
4. Claims 28-57 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for nitrogen dioxide as an interfering compound, does not reasonably provide enablement for any other nitrogen-containing interferant. The specification does not disclose any embodiment, in which thermal oxidation of the substance in a thermal oxidizer yields other nitrogen compounds, besides NO₂. Moreover, in the case if a mixture of NO₂ and NO is formed in the oxidation process, NO is disclosed in the specification as a non-interfering gas; therefore NO₂ is the only possible interfering gas.

Claims 38-41 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for removal device capable of selective converting NO₂ to NO, does not reasonably provide enablement for any other removal of nitrogen compounds. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. The specification explicitly discloses that catalyst from Group VIB transition metals, molybdenum in particular, is

capable of selective converting NO₂ to NO. No other enablement for catalyst of this group of metals is disclosed in the specification.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claims 28-37 and 40-57** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dugan (US 3,838,969, IDS) in view of Chand (US 3,622,488, IDS).

Dugan discloses an apparatus for measuring the concentration of a substance, comprising a thermal oxidizer, a removal device for selectively removing the nitrogen-containing interferant from the sample gas, and a detector: "in the apparatus the combustion zone 10 consists of a combustion chamber 12 and a combustion furnace 14. The combustion chamber is a quartz tube containing quartz wool, which acts as a baffle and provides additional high temperature contact surface for complete combustion of any stray fragments of the sample. The reduction zone 20 consists of a reduction chamber 22 and a reduction furnace 24. The reduction chamber is a quartz tube packed with 30 to 60 mesh copper" (col. 2, lines 12-20). The thermal oxidizer has a temperature control device, which maintains the temperature in the combustion chamber at

1080°-1150° C (col. 2, lines 55-57). The removal device, which is a thermal catalytic converter or a scrubber, since it removes nitrogen oxides from the sample, is temperature controlled, since it maintains the reduction chamber at 800°-850° C (col. 2, lines 66-68). The copper catalyst also works in the range 400°-650° C (col. 1, lines 20-25). While no specific temperature control of the converter is disclosed, it would have been obvious for anyone of ordinary skill in the art to use either one temperature controller for both pyrolyzer and converter, or separate controllers. While mesh copper is disclosed, any conventional form of a catalyst, such as turnings, wire, foil, or screen, are obvious for use in Dugan's apparatus. Also, it would have been obvious to use a catalyst retainer of any type recited in claim 50, because this allows to decrease the amount of the catalyst used, comparing to the amount used for packing the quartz tube with the catalyst, as disclosed by Dugan. The housing comprises input and output tubes (Figure 1). While no specific material for these tubes is disclosed by Dugan, it inherently is thermostable and inert, with stainless steel conventionally used in pyrolysis.

Dugan does not specifically disclose a type of detectors; however, he indicates, "other methods of separation and detection of the gaseous oxidation products, after reduction of the oxides of nitrogen to nitrogen and reduction of the sulfur trioxide to sulfur dioxide may be employed" (col. 5, lines 23-26).

Chand teaches a method and apparatus for measuring sulfur dioxide concentrations "rapidly and continuously" with electrochemical cell detectors.

It would have been obvious for anyone of ordinary skill in the art to use electrochemical detection disclosed by Chand in Dugan's method, because it allows measuring sulfur oxides "rapidly and continuously" and can be used outside the laboratory, as emphasized by Chand (col. 1, lines 34-44).

Allowable Subject Matter

8. **Claims 59-68** are allowed. The following is an examiner's statement of reasons for allowance: Dugan discloses the remover for specific converting of NO₂ into N₂, which is especially inert for electrochemical detectors, disclosed by Chand. Dugan and Chand do not disclose or fairly suggest a converter for specific converting NO₂ to NO. It would not have been

obvious for a routineer in the art to remove nitrogen dioxide by reducing it only to nitrogen oxide, since electrochemical cells can be sensitive to any oxidized forms of the compounds.

Response to Arguments

9. Applicant's arguments filed 02/20/04 have been fully considered but they are not completely persuasive. The arguments regarding rejection over Dugan in view of Chand are not quite clear. Dugan's goal is to remove ~~interfering~~ nitrogen dioxide as an interferent in the analysis of other oxides, particularly sulfur dioxide. For this purpose he is using a removal device, recited in claims 28-37 and 40-57. Moreover, Dugan specifically indicates a free choice for a detector for oxidized compounds: "other methods of separation and detection of the gaseous oxidation products, after reduction of the oxides of nitrogen to nitrogen and reduction of the sulfur trioxide to sulfur dioxide may be employed" (col. 5, liners 23-26). Dugan does not disclose any details of his apparatus, which would limit or define this choice. Chand provides an excellent detector for oxidized compounds, specifically SO₂, namely an electrochemical cell. It is absolutely not clear, why Chand's disclosure goes "in sharp contrast" to Dugan, when Dugan suggests using any detector for oxidized compounds and Chand provides such detector? Moreover, the Applicant's argument that "Dugan teaches using Cu to reduce NO_x to N₂ and therefore teaches away from a combination employing an electrochemical cell as the detector because electrochemical cells are not sensitive to N₂" actually supports the examiner's point of view: the electrochemical cells are excellent detectors for oxidized compounds, including SO₂, exactly because they are not sensitive to N₂, which therefore do not interfere with detection of SO₂. Therefore, the Applicant did not provide any convincing argument for non-obviousness of employing sensitive Chand's detector for SO₂ in Dugan's apparatus, which detects oxidized compounds while eliminating interfering nitrogen compounds.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yelena G. Gakh
3/31/04

Yelena Gakh